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THE JOURNAL OF PHILOSOPHY

STUDIES IN THE STRUCTURE OF SYSTEMS

5. THE NATURE AND FUNCTION OF DEFINITIONS IN A DEDUCTIVE SYSTEM [1]

SOCRATES invented the method of defining; Plato added the method of division and classification; and Aristotle determined the nature and function of definitions in a deductive system. In his disposition of the structural elements, definitions are treated on a par with axioms as immediate principles of syllogisms. The axioms are the *koinai* from which proofs flow; definitions are the *idiai, to genos to hypokaimenon.* Or, according to a different passage in the Analytics, the "immediate principle" of the conclusion is either an axiom or a "thesis"; and the latter is an "hypothesis" (if it is concerned with a "that") or a "definition" (if it is concerned with a "what"). In the Aristotelian Theory definitions are integral parts of a deductive system. And this theory of the function of a definition follows consistently from his theory of the nature of a definition: it is "the expression of what a thing is"; and consequently it is the *peri ho* of the proof.

In this theory Aristotle followed the Socratic-Platonic teaching. It was adopted by Euclid, whose Elements are for the nature and function of definitions, as well as for the other structural elements of a deductive system, the living pattern for the succeeding generations.

The moderns, especially the mathematicians, have completely departed from the classical tradition. Their theory is essentially that of Pascal; definitions in geometry are, according to him, mere nominal definitions; they merely give to things (which are clearly designated in terms wholly known) a name. And thus Mr. Peano in the paper "Les Définitions Mathématiques" [2] which he presented at the International Congress of Philosophy, writes: "Une définition . . . est une égalité dont le premier membre est un mot, ou

[1] With this paper I am continuing the publication of studies the substance of which was first presented over twenty years ago in a course of lectures at Harvard University. The preceding papers appeared in this JOURNAL, Vol. IX, pp. 197, 317, 431; Vol. X, p. 64.

[2] *Logique et Histoire des Sciences: Bibliothèque du Congrès International de Philosophie.* Paris, 1900. Vol. III, p. 283.

signe, qui ne figure pas dans le second." Mr. Peano and others (e.g., Mr. Louis Couturat [3]) emphasize the form of an "*equation*"; this is not merely a form which a definition may or may not have. No! Only equations can be definitions. ". . . une proposition qui n'est pas une égalité ne pourra pas être une définition." [4] In the theory which Mr. Whitehead and Mr. Russell [5] have sponsored, the sign "=" is retained, but stands no longer for "equality" (or even "identity"), but, taken with "Df." ("the two are to be regarded as together forming one symbol") is a mere abbreviation for "is defined to mean." This is merely the consistent development, in a form which is important for the symbolic representation, of the nominal theory of a definition. A definition becomes thus a "mere convention," a "mere symbolic abbreviation" [6] a mere "typographical convenience," "theoretically unnecessary," "no part of the subject in which it occurs," "concerned wholly with the symbols," "not with what it symbolizes." [7] And this theory is consistently applied in the monumental *Principia:* all definitions are patterned after the definition of "implication":

$$p \supset q. =. \sim p \vee q \text{ Df.},$$

where the expression on the left side of the sign "=" is the "definiendum," [8] and the expression on the right side, the "definiens," is a combination of symbols $\sim$, $\vee$, which stand for "primitive undefined ideas." [9]

If definitions are no more than this theory asserts, then we may indeed ignore them in a study of the structural elements of a deductive system; we are not concerned there with mere "typographical conveniences."

And yet, even to call this a "theory" and to question its truth is more than the theory itself permits, which should refer to it as itself a "definition," not a proposition or theory; and therefore itself merely practically convenient, but not debatable as "true or false." Yet, we do raise the question; and we answer it: we try to show that in a definite meaning of the word "truth" it is a *false* theory, in

[3] Cf. especially his *Les Principes des Mathématiques.*

[4] Peano, *l.c.*, p. 279.

[5] The theory is stated in A. N. Whitehead and B. Russell, *Principia Mathematica,* Cambridge, 1910, etc., Vol. I, pp. 11, 12, 98. It remains unchanged in the second edition of the first volume. An earlier statement of it is to be found in B. Russell, *Principles of Mathematics,* Cambridge, 1903, p. 63.

[6] B. Russell, *Principles of Math.*, p. 63. The other quotations are from the *Principia.*

[7] Cf. also Peano, *l.c.*, p. 288.

[8] Strictly speaking, the authors do not define here "implication" (which is a "relation"), but "p implies q" (which is a "proposition"); but this distinction is not important here.

[9] *L.c.*, p. 6.

that it is "inadequate." Not only this, but the authors of the *Principia,* carrying the nominalistic theory to its logical conclusion, were quite clearly somewhat troubled thereby. This theory of definition makes certain well-known facts of defining paradoxical. "It is a curious paradox," Mr. Russell wrote in the *Principles of Mathematics,* p. 63, "puzzling to the symbolic mind, that definitions, *theoretically,* are nothing but statements of symbolic abbreviations, irrelevant to the reasoning and inserted only for practical convenience, while yet, in the development of a subject, they always require a large amount of thought, and often embody some of the greatest achievements of analysis."[10] And in the *Principia:* "In spite of the fact that definitions are theoretically superfluous, it is nevertheless true that they often convey more important information than is contained in the propositions in which they are used . . . it will be found, in what follows, that the definitions are what is most important, and what deserves the reader's prolonged attention."[11] These remarks have their source in an incomparable experience in the making and using of definitions. They express with great candor just this opposition between the theory and the practice of the authors as regards definitions. For is it really only a "paradox" with which we are concerned here? To give a thing a good "name" is often, no doubt, difficult; and always, in the progress of thinking, psychologically of great importance. But this is not at all what the authors mean here! In the experience to which they refer, the "names" (and the corresponding "concepts," and, may I add, the "entities" of which these are the concepts?) are usually already well known; where can there be any particular difficulty or importance in the "definition" understood as a mere "symbolic abbreviation"? Could it be that the "paradox" has its root in the fact that the theory of "nominal" definitions is wrong? And yet, we open the book, and the definitions have indeed the form which the theory demands!

A proposition which does not have the form of an equation, is not a definition, says Mr. Peano. Yet we find many definitions made even by the masters, which do not have the form of an equation. I mention only the famous definition which Dedekind gave of a simply infinite system[12]: "So besteht mithin das Wesen eines einfach unendlichen Systems N in der Existenz einer Abbildung ϕ von N und eines Elements 1, die den folgenden Bedingungen α, β, γ, δ genügen:

[10] *Principles of Mathematics,* p. 63.

[11] Whitehead and Russell, *Principia Math.,* p. 12.

[12] R. Dedekind, *Was sind und was sollen die Zahlen,* p. 71.

α) N'3N
β) $N = 1_0$
γ) Das Element 1 ist nicht in N' enthalten
δ) Die Abbildung ϕ ist ähnlich."

Of course, we could say that this is a negligence in the style of the great mathematician; that the definition could and should have been stated in the form of an equation. Suppose, however, it were done. It is still a fair question whether this transformation of the statement into an equation is essential. Not merely that it is now more elegant, or conforming to the pattern of a *good* definition, or is in a practically more convenient form, but that it is essential; so that a statement thereby becomes a definition, whilst before it was not a definition at all. For this is what the nominalistic theory demands! Of course this is non-sense. Of course Dedekind gave a definition of a simply infinite system. Of course a definition *is* not an equation; or an identity; or "= Df."

The nominalistic theory, in its definition of a definition, which is quite consistent, has singled out a totally superficial aspect of definitions, and used it as a defining trait of a definition; an aspect which, whatever its advantage, is not essential; and which has proved wholly misleading when statements about definitions are made. This is the first thing to see clearly; then only will definitions, mere practical conveniences, and quite superfluous according to the nominalistic theory, be recognized as integral elements of a deductive system, which are difficult to make, which play a rôle comparable with that of postulates, and which are one of the sources of the "New" in a deductive system. Our results will not influence the practice of defining, as this has really very little to do with that theory (even in the writings of the adherents of the theory); but it will free us from a narrow-minded dogmatism into which this practice is apt to fall; it will directly furnish a system of criteria by which a definition can be tested which has been the principal object of such investigations as Mr. Peano's into the nature of a definition. It will then appear in its full magnitude how enormous a progress has been made in defining and how greatly this has tended to liberate the human mind.

Let me abandon, for the moment, this theory of nominal definitions which has been accepted by most modern mathematicians and mathematical logicians; let me examine instead a few much simpler and less technical examples. The traits singled out here I shall then apply to the definitions of modern mathematics and logic.

In the Platonic dialogues we find Socrates attempting forever to arrive at definitions: what is the sophist, what is the statesman,

what is the good, what is knowledge? Let us assume that the attempt was successful, and furthermore, if you like, that the definition had been put into the form of an "equation." Would it have the form $x = f(a, b, c \ldots)$, where x stands for an "unknown," the $a, b, c \ldots$ for "known" entities?[13] But how can this be? The sophist, knowledge, the good could not really have been "unknown"! Those who participated in the endeavor must have known the good in good actions, and must have been able to distinguish these from bad actions. They had met and known sophists, studied mathematics as a kind of knowledge, before they attempted to define them. But, of course, you may say, the instances, the examples were known, but the good itself, knowledge itself, the sophist itself, the *ti esti,* the "concept" was to be found. And yet, how could the examples be securely known, if the "concept" was not somehow or other? How could the participants in the dialogue tell that this or that man *was* a sophist without having some grasp of the concept? On the other hand, if the examples were not securely grasped, how could the concept ever be clear and definite? No, with the classification of "known" and "unknown" elements which occur in a definition we do not get very far. But it is essential that the concept, known or unknown, is *put into relation* to other concepts, known or unknown.

And this was not the end of the story. Something was to be done with those definitions, after they had been made: Socrates proceeds to *other* statements about the entities, in addition to those stated in the definitions; e.g., that the good is knowable, can be taught, and is worthy of man's endeavor; that the sophist is bad and must be opposed. But if the definition were a *complete analysis* of the concept (as some writers seem to think), a complete enumeration of all the properties of the defined, then such further judgments would have to be contained in the statement of the definition itself. The definition does *not* contain them; it is not a complete enumeration. But it should contain determinations which *suffice* to deduce these further propositions.

The following seem thus to be essential features of a definition: (1) it states a system of *conditions,* which are satisfied by those and only those "things" which are recognized as "examples" of the defined; (2) this system of conditions *suffices* for the deduction of the *other* properties of the defined.

The same remarks apply to the definitions of geometry. If I should say: a parallelogram is a quadrilateral the opposite sides of which are parallel, then here, also, the name is not essential, nor

[13] This is Wundt's theory in his *Logik,* which accepts the nominalistic theory of definitions. I do not mean to say that it was original with Wundt; it is held by other logicians also.

the form of an "equation," but the system of conditions by which an entity is determined. And it makes no difference to the definition whether we proceed from "parallelogram" as already "known" in intuition, determining it "analytically" by the system of conditions (as we do in elementary geometry); or whether we construct the system of conditions synthetically, and then ask whether there exists an "object" which satisfies the conditions. But there is this important difference that in the former, the "analytic," procedure we are apt to think that the "existence" of what is defined is already guaranteed by intuition; or, more correctly, that we (wrongly) deem the exhibition, in intuition, of (approximate) examples to be a sufficient proof for the existence of the defined. It is noteworthy that Euclid did not take matters so nonchalantly: in his postulates he expressly "demands" the existence of a circle, of the indefinite extension of a straight line, etc. His "postulates" (*aitemata*) are what we call "existence postulates." The necessity to be concerned about the existence of the defined is much more immediate if we *begin* with a system of conditions. This synthetic construction has an air of freedom about it which may easily give it the appearance of arbitrariness; and calls for the corrective of an existence proof, or an existence postulate. We can define what we want to define! Even the authors of the *Principia* are of the opinion that definitions are merely "the expression of a volition" [14] (though, oddly enough, this is given as an argument why they "are not preceded by the assertion sign"!). Of course we can define what we want to; but whether what we have defined also *exists* is another matter. And if a definition is a sort of a baptismal service, we need not be bothered with existence proofs. But we might have asked whether *what* receives a name, the new "thing" which the definition introduces into the system, *can exist* in it. And that means, amongst other things, whether the system of conditions by which the definition defines, is *compatible* with the *other* conditions, e.g., those stated in the "postulates." Thus the system of conditions by which we defined a parallelogram is compatible with the other conditions which hold in plane Euclidean geometry. (More exactly, the *existence* of parallel lines is postulated here.) But it is not consistent with those which obtain on the surface of a sphere: here I may define a parallelogram as above; but it does not *exist*. And thus I may feel sufficiently assured of the existence of the root of an algebraical equation of the second degree by the general process of "solution," which shows how such a root can be constructed. But this holds true only if I work in the universe of *all* algebraic numbers; should my universe be limited to that of the "real" numbers, then such a root need not "exist"; and the

[14] *Principia Mathematica*, p. 11.

same is true if I speak of the root of an algebraic equation in general: here I must prove the *existence* of the defined entity; and this is what the Fundamental Theorem of Algebra does. These remarks merely state what is familiar from the development of modern mathematics; I should have omitted them were it not for the fact that the situation had become somewhat confused through the influence of Mr. Peano and his brilliant school (Mr. Russell, in a wider sense, belongs to it also). As I remarked above there are no existence postulates or proofs in the *Principia*. The authors surely did not rely merely on their insufficient theory of definitions (which, quite correctly, does not belong there, being a chapter in the Structure of Systems, not of Logic which is so splendidly represented by the *Principia*); but on the fact that in each case the system of defining conditions is built up out of the "primitive ideas." And it seemed obvious that, if "proposition" and "negation" had been introduced, "negation of a proposition," as well as "negation of a negation of a proposition," etc., were guaranteed thereby already. But in the theory of groups we find it necessary, after "addition" has been introduced, still to require that "$a + b$ always belongs to the system." So does Mr. Huntington[15] *postulate* that "$a + b$ always belongs to the system if a and b do"; and so does Mr. Sheffer[16] postulate the existence of $a \mid b$.

The really important point is, however, that a definition states a system of conditions, by which a *new entity* is introduced into the system. Its first function is therefore to determine a *class* of things, namely, the class of things which satisfy this system of conditions. And a system is called "well-defining," and the class itself "well-defined," if of every thing (in the particular universe, of course) it can be determined whether it belongs to the class or not (R. Dedekind). (This does not assume that these "things"—"members"—are "given"; but the method must be decisive for the case of any candidate claiming to belong.) In such a case of a well-determining system of conditions we may say that it "*defines*" in the sense that it *determines*.

The "parallelogram" of Euclidean geometry has many "properties," i.e., it satisfies many conditions: it is "bounded" by four straight lines, its opposite sides are parallel, they are also equal, the opposite angles are equal, the diagonals bisect each other, etc. The procedure in geometry is to begin with a definition; the *other*

[15] E. V. Huntington, "Sets of Independent Postulates for the Algebra of Logic." *Trans. Am. Math. Soc.*, Vol. 5, No. 3, p. 292, and "New Sets of Independent Postulates for the Algebra of Logic." *Ibid.*, Vol. 35, No. 1, p. 277.

[16] H. M. Sheffer, "A Set of Five Independent Postulates for Boolean Algebras." *Ibid*, Vol. 14, No. 4, p. 482.

properties are stated as *theorems* which require proofs. We may express this so: the definition is, in geometry, a system of *initial* conditions from which the other conditions (stated in theorems) are derived. But this can be done only if the definition itself belongs to a *system* (in this case plane geometry). Only then can we say that the other conditions really *follow* from the definition. And which conditions must be included in the definition depends in part on which conditions are already in the system. Our concern is here only with definitions in a *deductive* system; and here it is an important property of a definition that is a system of *initial conditions.*

The same remarks hold for the definition which Mr. Whitehead and Mr. Russell have given as the pattern of all definitions in the *Principia:*

$$p \supset q. =. \sim p \vee q \text{ Df.}$$

Here, too, it is not the "name" (or the symbol), nor the "$=$ Df," but the *right* side of the "equation" which is essential. It, too, is a system of conditions which are imposed on two propositions p and q; and this system is satisfied for any two propositions, if the first is false or the second true. If we proceed purely *synthetically,* as the *Principia* does (the *analytical* work is preliminary, and only the results of it are incorporated here), then we have therewith established a *relation* between two propositions, which did not occur before in the system and is therefore a *new* thing in the system. If we proceed analytically, we assume "implication" somehow, and our definition gives an analysis of the concept, "reducing" it to "negation" and "disjunction." But this analysis should not be confused with a chemical analysis: it does not lead to *the ingredients* of implication, nor necessarily to "simpler" concepts. But, in whatever manner we arrive at the above definition, if it is treated as an integral part of the system of mathematical logic, *other* conditions follow from it which implication also satisfies: e.g., that it is false that the first proposition is true and the second false. A definition can therefore be conceived here, too, as a *system of initial* conditions.

If we return to the example of the parallelogram, the next point will be clear also. Its defining conditions we called initial conditions from which the other conditions could be deduced, namely, that the opposite sides are equal in pairs, similarly the opposite angles, that the diagonals bisect each other, etc. But would it have been possible to select from the *latter* a group to *define* the parallelogram and from these, as a new set of initial conditions, deduce the former initial set, as well as the remaining conditions? In other words: could we, e.g., define a parallelogram as a quadrilateral in

which the diagonals bisect each other; and from this definition derive the proposition that the opposite sides are parallel? It is clear that this can be done; and in a system of Euclidean Plane Geometry, still to be constructed, it may be better to do so. (On the surface of a sphere, a parallelogram thus defined would exist, but the opposite sides would not be parallel!)

The same applies to the definition of "implication." We could have defined it, e.g., by the condition: it is false that p is true and q is false; and deduce from it the condition: p is false or q is true, which was the defining condition above.

What I am illustrating by these examples is this: the system of *initial* conditions is not *specifically* different from the other conditions, stated in so-called "theorems"; so that by a mere inspection of conditions we could say which are *defining* conditions and which are *derived.* Conditions *become* initial conditions *by our choice;* in this choice we have a considerable degree of freedom; and it is guided by considerations which are quite distinct from these conditions themselves. It is, of course, influenced by our choice of *terms* which are *"undefined,"* and by means of which all other terms are to be defined. This is obvious for the definitions which are made in the beginning of the system of geometry, or logic, etc.

But this occasions another question: *which* terms must be defined? Or: are there any terms which are "indefinable"?[17] Nowhere is the distinction between the modern practice of defining and the classical practice and theory more obvious and important than here. According to the theory which has been regnant from Aristotle to our own days, and momentous in its influence on philosophical thinking in general, there *are* certain ideas which *by their very nature* are *indefinable,* and in terms of which all others must be defined. They are often considered as the *most universal* ideas, of which other ideas are special cases. This form of the theory has its methodological basis in the classical theory of definition by *genus proximum* and *differentia specifica.* By this method we mount to "higher and higher" concepts until, at last, we come to a stop at "the most universal" concepts; there is not any more a "higher" genus; therefore they are absolutely indefinable; all other ideas must (and, we hope, can) be defined in terms of them. For our present purposes it is not essential to know which are these *"most universal"* concepts, these *"categories,"* these *"ultimates,"* which are at the same time the *"fundamental"* concepts, but merely

[17] The authors of the *Principia Mathematica* speak of *"Primitive* ideas" as well as of "Indefinables"; but it is not clear whether they really mean what they say. Just as Mr. Russell, in his *Principles of Mathematics,* had stated that implication is *indefinable,* though later, in the *Principia,* it *is* defined. The terms "indefinable" and "primitive" might therefore be taken by him in a *relative* sense: indefinable in a *given system.*

the theory *that* there *are* such, and that they must be the *initial terms* of the system. Neither is it our problem whether anything like this takes place in this or that science with this or that methodological procedure. Our problem is merely, whether this is so in a *deductive* system.

Another version of the theory that there are *"indefinables,"* which has been given great prominence in recent years, maintains that a definition is always an *"analysis."* (The theory goes, in fact, further and maintains that *all* thinking is, fundamentally, an *analysis,* namely, of a given complex reality, for purposes of description and relation.) It holds further than an analysis must lead to *simpler* constituents; and that it must ultimately come to a stop when it reaches concepts which can no longer be analysed, i.e., which are not compounded or complex, the *"simples,"* the *"primitive ideas."* And they are the *initial* concepts. Whether they are also, as might be, the *most universal* concepts, we do not ask here. This theory relies on a motive which, in modern mathematics and science, has had a decisive influence, namely, the principle of *"simplicity."* But it has been effective there as a *"critical"* principle, by means of which we make a *choice* between several *possible* definitions, etc. It does not say that a definition *must* be an *analysis,* nor that it *must* lead to *simpler constituents.* (As far as the general methodological background of this theory is concerned, namely, "analysis" as *the* scientific method, I remark, rather briefly and dogmatically—as lying outside my present purposes—that analysis is most valuable and indeed indispensable, but that it is *preliminary* to the building up, the *"synthetic"* procedure; which leads logically to the so-called *"postulate* method," or—platonically speaking—the *"method of the hypothesis."*)

These two theories maintain that there are *"indefinables,"* i.e., ideas which *can not* be defined. Both are contrasted with the theory that, in every deductive system, there must indeed be *"undefined"* terms with which we begin; but that these are not necessarily "indefinables." In other words: their being *accepted* (for various reasons) as "undefined" does not commit us to the theory that they *can not* be defined.

Now it is clear that this question would not be decided one way or the other if an idea, claimed as indefinable, were defined by somebody else; it would decide merely about this particular idea, but leave it open whether in another case we might be more fortunate in hitting on a really indefinable idea. Nor would the question be decided if an idea were presented to me as indefinable which I did not succeed in defining: someone else might. The case is a little different when *every one* of those ideas, let us say in geometry, which

are usually claimed as indefinable, *have* been defined; and still more so when this can be done in *logic,* which is admittedly near the fundamental structure of things. One thing, however, would be decisive in the above instances: if idea d can be defined in terms of a, b, c; and b in terms of a, c, d; so that the same term d functions in one case as a defined term, and in the second case as one by means of which we define; then it can not be possible that a definition is an analysis into *simpler* terms; nor can it be a progression which leads necessarily from less general to *more general* terms; as the theories stated above maintain.

Let me make this more concrete by accepting the *Principia Mathematica* as a monumental and successful attempt to define all ideas of logic and of mathematics in terms of certain "primitive ideas." To these belong "negation of a proposition p," symbolized by $\sim p$, and disjunction of two propositions p and q, symbolized by $p \vee q$. In terms of these primitive ideas we saw above that implication between propositions p and q, symbolized by $p \supset q$, is defined. Implication is then, contrary to Mr. Russell's earlier statement in the *Principles,* a *definable* relation. But are negation and disjunction *indefinable,* primitive, ultimate, simple? They certainly are "undefined" in the *Principia.* But it is also certain that they can be defined; and in a number of distinct ways. Thus if the authors had chosen Mrs. Ladd-Franklin's fundamental relation between propositions, "incompatibility" or "inconsistency" between p and q, symbolized by $p \overline{\vee} q$, they could have defined $\sim p$ by $p \overline{\vee} p$, and $p \vee q$ by $\sim p \overline{\vee} q$, and $p \supset q$ by $p \overline{\vee} \sim q$. Similarly, $\sim$, $\vee$, $\supset$, as well as $\overline{\vee}$, can be defined in terms of Mr. Sheffer's stroke relation $p \mid q$; and so on in the various ways familiar to mathematical logicians. Now I maintain, if on the one hand we can define $\sim p$ and $p \vee q$ in terms of "inconsistency"; and on the other hand "inconsistency" in terms of "negation" and "disjunction," you can not say that the definition in any of these cases leads to "simpler," or to "more general" ideas. The *interchangeability* of defining and defined terms makes this impossible.

The mathematician and the mathematical logician have thus a degree of freedom in the choice of their "undefined" terms. And the *property "definable" is relative:* what in one system, with a certain apparatus of "undefined" terms, is "indefinable," becomes "definable" in another system with a different choice of undefined terms. And if, preliminary to the building of a deductive system, you make a list of *all* the ideas which historically occur in the system, it is not determined *which* of them shall be "undefined." We make a choice. It is not even sure that the best choice is limited to the above list: we may construct new ideas and they may serve

better than any of the "known" ideas. Thus Mr. Sheffer's "stroke relation" is historically a new idea, and serves well as an "undefined" idea in logic. Whether our choice is, logically, quite free, or whether the interchangeability between defining and defined terms is limited, is still an open question: no limit has been found thus far; and whatever ideas have functioned as "undefined" in logic, have been defined; or can easily be defined. This does not mean, of course, that all such choices are equally "good"! But that raises a different type of question which belongs to the Critique of Cognition; and even the question would be vain, if there were not different choices.

The development of mathematical logic has not only promoted the technique of defining; it has also enabled us to separate here more clearly the purely logical question from the psychological. To express "unknown" ideas in terms of "known" ideas involves a psychological question; logic can not decide what is "known" and what is "unknown." Logic may aid psychology by establishing all the possible relations of the terms of a system, i.e., make *all* the logically possible definitions; so that psychology may pick the one which is made in terms of concepts known to an individual, or group of individuals. (A psychologist advising a teacher of arithmetic would certainly *not* recommend the definition of the cardinal number one given in the *Principia!*) The one thing important for the logician, the one requirement he makes of all definitions, is: that the defining conditions do uniquely *determine* the "definiendum" (to use the language of the *Principia*). If definitions are given in the form of "equations," this means that the right and the left side of the equation are really *equivalent;* of course in the given system; not necessarily otherwise.

In the construction of a deductive system the "undefined" terms appear as "symbols" (words, or signs) which, however we may have come to them, *have* no "meaning" in the system. That does not imply that they are merely arbitrary; for they have *relations* to each other which are determined in the "postulates" of the system, and in the definitions. So we can *give* them a meaning, of which we require that the resulting interpretation of the postulates and definitions also has a meaning and makes them true propositions. Otherwise this interpretation may differ widely from the meaning which the system-builder originally had in mind and used as an empirical guide in his work. This is the sense in which some writers (e.g., Mr. E. V. Huntington) speak of the undefined terms as *"variables,"* which only by a suitable interpretation receive a definite value. It is necessary, in this case, to distinguish an *"interpretation-variable"* from the ordinary *"system-variable."* The

latter, which Mr. Russell has used, takes values which are members of a definite system. The former takes values that determine *different* systems. Before an interpretation is given to the symbols which represent the undefined terms, the postulates are not "propositions," in Mr. Russell's limited meaning of the word: they are neither true nor false. That is, I suppose, what Mr. Huntington means by an "*abstract*" theory: it abstracts from a definite interpretation. It becomes, thus, a "concrete" theory only *after* an interpretation has been made. This way of conceiving the undefined terms as interpretation-variables is of great importance. It permits the construction of suitable examples for the "independence proofs" of the postulate sets.[18] Secondly it makes possible the development of a *general* theory which embraces several deductive systems.[19] Thirdly it may be used to prove that the system of undefined forms is "irreducible."[20]

If the above theory of the nature and function of definitions in a deductive system is accepted, various otherwise puzzling consequences follow immediately.

Firstly, it is obvious that if a definition is a system of initial conditions, defining is not likely to be a simple affair. It presupposes a careful study of the relations between the various terms of the system. And the difficulty of a definition will be still more apparent if the thing to be defined does not yet exist in the science in question. Whoever first defined a "chain," a "conformal representation," a "dense (as distinguished from a continuous) series" made a discovery which, without intimate knowledge of the particular field, would have been impossible. The many remarkable definitions which Mr. Russell and Mr. Whitehead have given are great achievements; and nobody doubts the effort which they cost.

Secondly, we shall recognize the *importance* of definitions in a deductive system; and the authors of the *Principia* quite rightly invite our careful study of their definitions. Definitions are really starting points for proofs, as Aristotle taught. And they can function in this way, because they state a system of conditions *comparable to the sets of postulates.* That they do function thus even a cursory examination of any deductive system will show. The mill would soon run dry, if the definitions did not, again and again,

[18] Cf. the numerous monographs by E. V. Huntington and others in the *Transactions of the American Mathematical Society.*

[19] Cf. E. V. Huntington: "The Fundamental Propositions of Algebra" in the collection: *Monographs on Topics of Modern Mathematics,* ed. by J. W. A. Young. Longmans, Green and Co. 1911.

[20] Cf. Padoa: "Essai d'une théorie algébrique des nombres entiers," in *Bibliothèque du Congrès International de Philosophie* (Paris, A. Colin, 1901), Vol. III.

furnish new grist. And in this close resemblance between definitions and postulates which our theory exhibits, lies the reason how it is possible for Mr. Dedekind [21] to develop his theory of natural numbers without a single postulate: his foundations are established in the various *definitions.*

Thirdly, if a definition is a system of conditions, then the *criteria of a good definition* will be the same which have been developed for systems of postulates: consistency, sufficiency, simplicity are the main ones. The first two we anticipated above when we said that a definition should determine a class, and should suffice as a basis for deriving all the other properties of the defined entity.

Fourthly, we can now decide the question whether definitions which are not in the form of "equations" are admissible. Mr. Peano denies this. Mr. Couturat agrees with him. But Mr. Burali-Forti [22] writes: "Définer un objet quelconque signifie: donner une ou plusieures relations logiques contenant. . . ." I agree with Mr. Burali-Forti. The arguments which Mr. Couturat made against Burali-Forti's distinction of three kinds of definitions: "J'appelle nominale, par postulats, par abstraction les trois formes de définitions," [23] are not conclusive.[24] They are directed against insufficient or bad definitions by postulates, not against this *form.*

Lastly our theory of definitions throws important light on the problem of the "New" in a deductive system which troubled Mr. Henri Poincaré, and of which he gave a wholly inadequate solution. Definitions are one of the sources of the new. I spoke of this above. It is clear of such entities as triangle, parallelogram, circle, etc., that we are dealing with things which were no part of the system until they were introduced by their definitions. It is at first perplexing that this is not so clear with the definitions of the *Principia Mathematica.* For here, indeed, all the entities of the system seem to be "reduced" to the "primitive ideas." If we take again the definition of implication

$$p \supset q. =. \sim p \vee q \text{ Df}$$

we have, on the right side, nothing but primitive ideas. How can anything *new* be thus presented? But, if we ask: was there already an implication relation between propositions? we may, looking at the definition, hesitate; we see only old friends on the right; but in the end we shall admit: no, there was none. Well, then the definition introduced it. But how can it introduce something new

[21] Dedekind, *Was sind und was sollen die Zahlen.*

[22] Cf. Burali-Forti: "Sur les Differentes Définitions du Nombre Réel." *Biblioth. du Congrès Intern. d. Philos.,* Vol. III. Paris, A. Colin, 1901.

[23] *L.c.,* p. 290.

[24] Couturat, *Les Principes des Mathématiques.*

using nothing but what is old? It would suffice if it was admitted *that* it introduced something new, even if we could not see *how?* And it were a marvel indeed if all the entities of logic, of mathematics, and of mechanics could be "reduced" to a handful of primitive ideas! Having reached the position of accepting the new, it is really a simple matter to see how the definitions of the *Principia* achieve it. It is only necessary to point out that the symbols $\sim$, $\vee$ occur here in a certain *configuration;* which is thus revealed as a *necessary element of the symbolism of the Principia.* Only in the given connection and order does the second member represent the implication relation; a change in the order may, though it need not, make a formula invalid. Implication is therefore not at all "reduced" to negation and disjunction. It is merely put in *relation* to them.

Why have the moderns derogated the importance of definitions and treated them as mere symbolic conveniences? The reason seems to be: they emphasize the *freedom* of defining. Definitions are, according to them, a matter for our *will;* you can define what you want and how you want; nobody can criticize you in this exercise of your will; i.e., definitions are not *"propositions"* and therefore *need not be "true."* But it would occur to no one to consider the serious definitions of the *Principia* as the results of such a bizarre "will." How much there is of "will," how much of "thinking" in any concrete act of thought, who would say in general. But we are not psychologizing now. We spoke above of a "choice"; and where there is a choice, there is, I suppose, a choosing will. We have freedom of choice here; but a *freedom subject to law.*

That the new achievement in the technique of defining means a revolution in our philosophic thought, that it puts the ancient problem of *"categories"* in a totally new light, with new freedom and new responsibilities, who can doubt?

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IS IDEALISM INCURABLY AMBIGUOUS?

PERHAPS the most useful of the functions which a technical journal is called upon to perform is that of enabling the experts in a subject to discuss their differences, and especially the meaning and appropriateness of their technical terms. This remark applies particularly to philosophy, which has long been suffering from the manifold ambiguities and scandalous vagueness of its leading conceptions. Accordingly, the enterprise of Professors Pratt, Barrett, and Brightman in trying to pin down the elusive term

"idealism" to something like a definite meaning is worthy of all praise,[1] and as their dispute is not a private one but concerns us all, I hope that some further comment on their efforts, from a somewhat different standpoint, will not be unwelcome.

My own sympathies have long been with Professor Pratt. Already when I wrote the last chapter in *Studies in Humanism* it seemed to me that the development of the problems and the personal vagaries of the philosophers who used the terms "idealism" and "realism" had rendered both of them unfit for the description of any live issue in philosophy; and the confusions, so deftly dealt with by Professor Pratt, which have resulted from their continued use seem to have fully justified my attitude. In view of the present chaos Professor Pratt's demand for a clear distinction between what is called "idealism" and what is called "realism" is a demand for clearness and honesty of thought. On the other hand the papers of Professors Barrett and Brightman also seem to me to provide valuable materials for an answer to Professor Pratt's question. I assume that he will answer them effectively, and that we shall all be instructed.

But I fear that, unless I intervene, it is unlikely that any of the present parties to the discussion will treat it, in future as in the past, from the broadest and most fundamental point of view of which it is susceptible, the point of view from which alone the whole dispute can be reduced to order, and room can be found for all its possibilities. I would call this the *Humanist* or Protagorean point of view, and trace it back to the dictum that *Man is the Measure of all Things*. This is surely not only the earliest, but also the most thoroughgoing, affirmation of the philosophic importance of man, which bears in its bosom all the later idealisms as partial, one-sided, and more or less misconstrued developments. It leads up naturally to the simple, sweeping, and one might hope non-contentious definition that any view which realizes that some reference to man is always implied in any world with which man is concerned, and can never be expunged from it, is fit to be called idealism.

If then we disabuse our minds of traditional but groundless prejudices which construe relevance to man as absolute relativity, and relativity as subjectivity, and subjectivity as solipsism and/or scepticism, it is not difficult to see that the dictum of Protagoras is in no wise a denial of any "reality" which can be of human interest or importance, and that, as a methodological principle at least, it carries the completest assurance of a possible harmony between man and the world he inhabits. It rules out from human measurement none but realities which are alleged to be unknowable, unmeaning,

[1] This JOURNAL, Vol. XXX, pp. 169–178, pp. 421–429, pp. 429–435.

inoperative, fictitious, or absurd. If humanism therefore be idealism, it is an idealism to satisfy all human demands and to which humanly no exception can be taken. It is the *first,* both logically and chronologically, the most comprehensive and complete, and all the other "idealisms" can easily be developed out of it by various restrictions.

Thus (2) solipsism (for which, paradoxically enough, Professor Brightman finds no room among his four historic forms of idealism) is easily fabricated out of it. For if abstraction is made from the fact that man's activities are not only "theoretic," but also "practical," solipsism at once becomes a very obvious and obstinate consequence of the relativity of all experiences to an experiencer.

(3) Berkeleyan "idealism" also is easy to arrive at, if attention is focussed exclusively on the dependence of perceptions on a percipient.

(4) Out of this, as history showed, Humian "atomism" (a second form of idealism for which Professor Brightman's classification has no place) springs up, if an attempt is made (however unsuccessfully) to resolve the percipient into perceptions.

(5) A place can be found also for the enigmatic doctrines of Plato, which abstractly might just as well be labelled "realism" as "idealism," though for linguistic reasons they can not be expelled from the pedigree of idealism. What precisely Plato meant by his Forms or Ideas at various epochs of his thought will always probably remain a subject for dispute: but something like agreement may perhaps be reached at least on this, that they arose in the context of what we should call a *logical* problem, and in order to justify the practice of predication. If so, it may be said that Platonic "idealism" arises from taking man as a logical creature, just as Berkeleyan arises from taking him as percipient.

(6) Professor Brightman's description of "Hegelian" idealism, "reality is organic—wholes have properties which their parts do not have" (p. 432), is easily deducible from "man is the measure." For all its constituents "reality," "organism," "whole," "part," are plainly human constructions based on human experience, and their adequacy and "truth" are still being worked out and tested.

(7) Professor Barrett's somewhat divergent version of "Hegelian" idealism leads to the same conclusion. According to Professor Barrett (p. 423) "Hegel pointed out that all perceptive activity requiring a subject-object relationship, implies a more inclusive synthesis. Subject and object alike depend upon his higher synthesis for their being, and finally upon the unconditioned synthetic unity of the world order, of which they exist as organic parts. This world order, being absolute, can not participate as an infinite Mind

in the relational activities of consciousness; that is, it can not itself be conscious, or a perceiving agent." This omits the important claim of the Dialectic to predict the course of history, but plainly postulates a large number of human notions, the superhuman validity of which remains problematic, viz., (*a*) subject-object, (*b*) higher synthesis, (*c*) world order, (*d*) unity of the universe, (*e*) the unconditioned, (*f*) the absolute, (*g*) the infinite, (*h*) mind, and (*i*) relation. Whether (and if so, how far) these notions are applicable to human life and helpful in understanding it is, or should be, a matter for philosophic inquiry. But their status and value can hardly be taken as independent of human purposes and as *a priori* certain.

(8) From Professor Barrett's summary of the other orthodox or "objective" idealists it would appear that they all agree in substituting a *relational* for a perceptual dependence of the world on "mind." But is this a vital difference? Does it dehumanize the world completely? Does not this interpretation still leave "idealism" dependent on the nature of the *human* mind and its conception of "relation"? And does it not still leave the transition from the human mind to the absolute a *salto mortale* which no idealism has accomplished by legitimate means, and which it can not accomplish without discrediting itself as an instrument for cognizing reality? Surely the sceptical ending of F. H. Bradley's "idealism" has sufficiently revealed this unavoidable dilemma.

(9) Professor Brightman makes a recognition of Value pivotal for one of his sorts of "idealism," and credits it to Plato[2] (p. 432). But it is not at first sight obvious why an assertion that "value is objective—its meaning and origin lie beyond the human knower" should be labelled "idealism" at all, especially when one remembers that the analogous assertion that reality is objective and independent of man is usually regarded as the basis of "realism." It is no doubt highly important for philosophy to recognize how all-pervasive values are and that conceptions like those of "higher," "lower," "adequate," nay of "reality" itself, involve value-judgments; but this would appear to be quite a modern discovery. Moreover whatever "objectivity" values may acquire socially, they certainly *start* as personal valuations, so that their "objectivity" rests in ultimate analysis on the practical agreements and conveniences of persons—very much like the "independent reality" of realism. Value then is plainly Protagorean rather than Platonic.

(10) Professor Brightman's "Lotzean" "reality is personal—

[2] This attribution is presumably based on the mention of the Idea of the Good in the *Republic*. But the Good there plainly stands merely for the principle of teleological interpretation, which is admittedly *ex analogia hominis*. Moreover it had cosmic significance in Plato's eyes, not *qua* good (value), but *qua* "Idea" (true reality).

only persons or selves are real" (p. 432) comes nearest, of all his "idealisms," to a recognition that *unmutilated* man is the true measure. For man assuredly (and also any "mind" we know) is personal, and personal idiosyncrasies underlie all philosophies. But that "*only* persons are real" remains a hypothesis, to which it does not seem necessary for man to commit himself *a priori*.

There remain two sorts of "idealism," to which neither Professor Barrett nor Professor Brightman has made reference, namely, (11) the use of "idealism" in a moral sense. This derives, not from "Idea" nor from "idea," but from "ideal." This sense of "idealism" is highly popular, and it seems doubtful whether it can ever be eradicated. For if it were discarded, it would become ever so much more difficult for "idealists" to get themselves appointed to professorships, simply as such. So the human motive underlying this sort of idealism is sufficiently obvious.

Lastly (12) it has not been mentioned either by Professor Barrett or by Professor Brightman that there is a profound difference between *a priori* and empirical idealisms. Yet any idealism may (*a*) jump from the fact that a conception can be formulated to the conclusion that it is *valid*, in the sense of applicable to life or reality; or (*b*) it may recognize that its conception still stands in need of verification in experience and by its working. Historically the more notorious and typical idealisms (especially Nos. (5), (6), (7), and (8)) have all been conceived to belong to the first class; that is, they have been based on the "ontological" argument and have argued *a priori*, even though they might perhaps have stated their case empirically and submitted to confirmation from experience. Yet it hardly follows from the fact that a conception is desired (and perhaps desirable) that it is also applicable and true of the real. Moreover, empirical idealisms have a distinctive argument of their own: they can argue from the existence of dream-worlds as psychic facts. Finally, it should be observed that no empirical idealism, since it admits the need of verification, can acquire more than some degree of probability. Hence the requirement of empirical verification incidentally strips idealism of its chief charms; it rules out of order the claim of idealist systems to "necessary" truth. Even if they could make good their claims to be necessities of thought—and their numbers would seem to discredit such claims—it would remain open to question whether necessities of thought could control the real, and so whether the systems were actually true.

What is left, then, of the *apologia* for idealism? According to Professor Barrett (p. 427), "Objective idealism relies upon the final cosmic significance of value, coherence, and systematic completeness." But all of these are human ideals, which have to be ac-

commodated to the other human ideals, and can not be allowed to negate them without further discussion. According to Professor Brightman (p. 432), idealism is more than mentalism, because it includes "the problems of value and of mind" (p. 433). So for him there are four sorts of idealism, and "any system is idealistic which affirms one or more of these four propositions, provided Hegel's be included" as the "minimum idealism" (p. 432).

Actually, however, we have seen that there are a round dozen of "idealisms" which can be, or are, maintained. And Professor Brightman's "definition" only covers four of them. Is it well, is it fair, is it safe, to withhold official recognition from the rest? It would no doubt be a counsel of perfection to devise distinctive names for all of them, and to enforce consistent recognition of these distinctions: but in default of this ideal will it not have to be confessed that "idealism" is an incurably ambiguous term? And, if so, ought it not to be dropped as mischievous and unscientific from our philosophic vocabulary?

Lastly, I may be asked, But what about realism? Is it any better? If so many sorts of idealism are recognized, what place is left for realism? Will it not be merged in some of your idealisms? And then our hoary academic dichotomy between realism and idealism may have to be scrapped altogether and cast upon the dungheap!

I should be sorry to give needless offence to any form of realism, which seems to me by far the less tricky and pernicious sort of dogmatic metaphysics. But as a complete or Protagorean idealist, who is glad to think that man may be an *adequate* measure of *his* experience, who holds that he has no right to torment himself with unmeaning problems about what can not be related to human experience, and who is glad to find that actually a reference to man lurks in all the "objective" realities commonly recognized, I should be far from inconsolable if it turned out that adequate accommodation *could* be found for most "realisms" in my "humanism." I would venture also on the suggestion that all the realisms that seemed plausible and reasonable could find a place in one (or several) of the pigeon-holes provided for idealisms. As for the rest, for which no place could be found, might they not be dismissed as perverse, superfluous, and unprovable? But this is not of course to imply that there would be no philosophers who insisted on "believing" in them, nor to deny that animal "faith" may frequently get the better of human "reason."

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BOOK REVIEWS

Mysticism East and West: A Comparative Analysis of the Nature of Mysticism. RUDOLPH OTTO. New York: Macmillan Company. 1932. 262 pp.

The title of this very valuable book is somewhat misleading; for it is not typically eastern and typically western mystical experience which it compares, but two varieties of a special type of mystical theory. The book, in fact, is a comparative and analytical study of the "mystical" philosophies of Śankara and Eckhart. It is marked by an unusual balance between sympathetic insight and critical judgment; and is based upon profound Christian and Indian scholarship and sensitivity for the niceties of the psychology of religion.

There are two extreme opinions to both of which our author is firmly opposed. One asserts that in mysticism as in other things "East is East and West is West, and never the twain shall meet"; the other insists that mysticism is always essentially the same in all the mystics of all the lands and all the centuries. Against both of these schools Otto maintains that "in Mysticism there are indeed strong primal impulses working in the human soul which as such are completely unaffected by differences of climate, of geographical position, or of race. These show in their simplicity an inner relationship of types of human experience and spiritual life which is truly astonishing. . . . It is false to maintain that Mysticism is always just Mysticism, is always and everywhere one and the same quantity. Rather, there are within Mysticism many varieties of expression which are just as great as the variations in any other sphere of spiritual life, be it in religion generally, or in ethics, or in art. These variations as such are not determined by race or geographical situation, but they may appear side by side, indeed they may arise in sharp contrast to one another, within the same circle of race and culture."

The larger part of the volume is devoted to a detailed study of the great similarities, in both thought and expression, between Śankara and Eckhart; a briefer section points out the equally fundamental differences between the two thinkers, and explains them by means of the contrast between the Indian and the Christian traditions. In the large literature of the subject it is doubtful whether one could find another equally excellent exposition of the two men here studied. The examination of each in the light of the other brings to the fore certain nuances of thought and attitude in each which to the present reviewer at any rate had never before been suggested and which constitute a fascinating lure for further

thought. The limits of this review forbid a detailed consideration of the various topics discussed; but one question of a fundamental sort should perhaps be raised. This question, though in one sense fundamental, is from another point of view perhaps superficial and purely verbal—the question being this: What, after all, is mysticism? And more specifically, is mysticism a type of theory or a type of experience? It is not altogether certain what Otto's answer to this question would be. The detailed study of Śankara's and Eckhart's philosophies might seem to indicate that the author regards mysticism as a form of philosophical or theological theory; and specific statements point in the same direction. The sense of union with the Divine, we are told, is not essential to mysticism, provided the Divine or the ultimate Unity be conceived in non-rational fashion. "It is characteristic of certain types of Mysticism to seek the *Deus sine modis*, and to cherish Him in the soul. 'God' is then experienced in an act of union. But a man is a mystic as soon as he has this conception of God, even when the element of union recedes or remains unemphasized, which can easily happen in Mysticism. It is the wholly non-rational character of this conception of God with its divergence from the innate, personal, modified God of simple theism, which makes the mystic. . . . Etymologically 'mystic' has nothing at all to do with a 'union.' *'Mystica'* was originally an adjective qualifying the substantive 'theologia.' The essence of the *mystica theologia* lay in the fact that it claimed to teach a deeper 'mystery' and to impart secrets and reveal depths which were otherwise unknown." On the other hand, Otto tells us, these secrets and depths were conceived as revealed by a mystical *sense;* and he writes, "Mysticism enters into the religious experience in the measure that religious feeling surpasses its rational content, that is to the extent to which its hidden, non-rational, numinous elements predominate and determine the emotional life." If one should venture to criticize Otto's general treatment of mysticism in this book it would be well to begin with the uncertainty, never fully dissolved, as to just what mysticism means to him. The non-mystical reader at times feels that he is a little too indulgent with Śankara's and Eckhart's disregard of the principles of Contradiction and Excluded Middle, and that, being a mystic himself, he has caught from them something of their habit of slurring over distinctions and of uniting incompatibles. Though criticism of this sort be to some extent justified, however, it should be a consideration of secondary importance in the appraisal of a book which is certainly one of the finest expositions of mystical theology ever written.

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Invitation to Philosophy. DURANT DRAKE. Boston: Houghton Mifflin Co. 1933. xxvi + 537 pp.

Introductions to philosophy are quite various in make-up. They reflect, in the main, two things: the author's philosophical position and his pedagogical methods. It is these factors, I take it, that determine the structure of the book he offers to his colleagues and the reading public. There is, in addition, the almost equally important element of workmanship and literary quality.

As all teachers of philosophy know, Professor Drake served his apprenticeship as a writer of introductions years ago. Hence we have certain rightful expectations when we open a new book from his pen. For instance, we anticipate that the book will be well written and will possess both clarity and charm. Judged on these points, *Invitation to Philosophy* is a typical Drakian production. It is, as we should expect, somewhat more solid than some of the earlier works. Quite evidently, it is a product of years of teaching and of philosophical reflection.

In what follows I shall try to give brief indications of the topics covered and the point of view adopted. On a few crucial questions I shall make comments reflecting my own perspective.

The book is divided into five main parts entitled, respectively, The Quest of Truth, Knowledge and its Object, The Cosmos, Life and Mind, Values. Each part has its relevant chapters. Thus, under the first, we have such sub-headings as The Voice of Authority, Intuition and Faith, A Priori Truth, Empirical Knowledge, and Pragmatism. Taken together, these chapters furnish a sort of criteriology and make an excellent preparation for the later parts. I judge that it was written to make the path smooth for the very frank naturalism which was to follow. In the final chapter of this section pragmatism is quite roughly handled, though it is the more sentimental pragmatism of James rather than the experimentalism of Dewey that Drake has in mind.

It is soon noticeable that the common historical approach is completely discarded. The student is not invited to understand Cartesian dualism and the controversy about the status of ideas. This whole background in relation to which theory of knowledge is usually discussed is simply omitted. There are, of course, losses in such an omission as well as gains. I am, myself, still a conservative on this point.

The reviewer was very naturally interested in the second part, which deals with epistemology. The argument begins with the inadequacy of naïve realism and passes to subjectivism and idealism. After these possible positions are studied there is the return to realism of a supposedly more adequate sort. I shall allow myself

certain comments on Professor Drake's constructive position. Sensa are merely supposititious existents. I must confess that I find a certain ambiguity in the use of this term "sensum." It is my feeling that it covers, in a blanket fashion, sensory content, a denotative reference, and a description. It is quite true that we can make references with descriptive interpretations when there is no corresponding existent. Is this all that is meant? If so, I think that the term "sensum" is badly chosen since it has other associations for most people. Another point. Professor Drake is so much impressed by the motor factor in perception that he seems to me to fail to distinguish between the motor *conditions* of a perceptual experience and the actual experience. It is my impression that his panpsychism tempts him to regard this perceptual experience as an illusion. He is quite aware that there are complicated operations in the organism but his rejection of emergence forbids him to regard the perceptual experience as emerging with these operations.

There is a detailed discussion of relativity in the third section. He is decidedly of the opinion that the theory of relativity can not be given ontological significance. With much of his treatment I have sympathy; yet I suspect that he does not sufficiently realize the physicist's standpoint, which is operational and positivistic. I wish that Professor Drake had defined what he means by space and time.

There are excellent summaries of the results of science all through the middle sections of the book. The reader is warned against naïve notions of evolution and against romantic ideas of a life-force. It is straight mechanism and determinism which is taught. I found myself quite in sympathy with his defense of actual causality, but much more hesitant with respect to his mechanistic views.

And this brings me, again, to Professor Drake's treatment of emergence. Certainly, my notion of emergence is not the one he criticizes. I should like to ask him what *organization* and *wholes* mean to him. Is a system more than an aggregate? Thus, he is ready to stress a certain unity in an organism's motor-response, but it does not seem to be an organized unity but a kind of constellation. To put it in psychological terms, I am more of a Gestaltist than he is. I can not help feeling that his handling of the term "sensum" helps him to avoid the psycho-physiological problem here.

The treatment of values is delightfully clear and concrete. Especially good is the chapter of beauty. The discussion of morality will give a satisfactory orientation to the student. Perhaps there is too much omission of technical points but, once again, this can be defended on the score that the essential thing is an orientation.

The final chapters deal with religion, the God-idea, and human destiny. There are some excellent quotations to illustrate contemporary views of religion. Drake, himself, evidently favors something like humanism though he is somewhat equivocal on the matter. I judge he is reluctant to relinquish a term which has the "emotional overtones" possessed by the word "God."

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Spinoza-Festschrift. Edited by SIEGFRIED HESSING. Heidelberg: Verlag Carl Winter. 1932. Pp. xvi + 222.

Spinoza, The Man and His Thought. Edited by EDWARD L. SCHAUB. Chicago: The Open Court Publishing Company. 1933. Pp. 61.

Spinoza. S. ALEXANDER. Manchester: Manchester University Press. 1933. Pp. 20.

Spinoza: Sa Vie et sa Philosophie. HENRI SÉROUYA. Paris: Éditions Excelsior. 1933. Pp. 83.

The recent celebrations of the tercentenary of Spinoza's birth and the scores of essays written in his honor are witnesses to the appeal Spinoza makes to his readers. The essays in the volume edited by Mr. Hessing may be divided into eulogies, those dealing with special problems in Spinoza, and those that treat of his relation to Judaism. The tributes to Spinoza are beautifully written and very touching. With the exception of the essays by Dr. Brucar, Professors Gherasim and Siegel, the special topics are eulogistic in character and add little to our understanding of Spinoza. Of the papers dealing with the Jewish phases of Spinoza, we shall consider only those of Professors Klatzkin and Klausner.

Professor Myślicki, in the volume above mentioned, places the power of Spinoza's attraction in his ability to integrate the various extremes of human nature that so often appear chaotic and inharmonious. Nevertheless, Professor Myślicki seems to realize the lack of evidence in favor of this position when he admits at the end of his essay that if Spinoza was not an ideal nature he, at least, strove to be one. Others, guided by the intent of Spinoza rather than by his actual accomplishments, regard him as the most systematic of philosophers. Those who find in Spinoza a complete system do so by virtue of minimizing inconsistencies and ignoring difficulties. Their vision of a system in Spinoza is a result of their admiration of him rather than a cause of it. How then can this interest in Spinoza be explained? Spinoza's appeal must be understood in terms of the dramatic contrast between the man and the problems he proposed to solve. It is the contrast between the lens-grinder and the contemplator that captures our imagination. We stand in awe before

the spectacle of a man in the gutter pointing in the direction of the most total and continuous happiness, saluting and embracing God.

Dr. Brucar asserts that the doctrine of the eternity of the mind follows logically from Ethics I and II and that Spinoza introduces this doctrine in order to make the intellectual love of God possible. However, an examination of Ethics V will show that Prop. XXIII can not be inferred from Book I and II and that the intellectual love of God is the ground for the eternity of the mind rather than the consequence of it. For Professor Gherasim the most significant feature of Spinoza's doctrine of the emotions is his emphasis on the extra-rational as well as the rational parts of our psychical life. The possibility of a clear insight into the irrational elements of our soul is afforded us by Spinoza's treatment of will, love, and desire as modes of the attribute of thought. Professor Siegel sets up a system of emanations beginning with "God as such"—to *natura naturans* as God with respect to nature—to *natura naturata* as "nature generally" with respect to God—to the sum total of "particular things as such." To each of these levels there is a corresponding type of knowledge. Intuitive science belongs to *natura naturans,* rational knowledge to *natura naturata,* and inadequate knowledge to particular things. "God as such" can not be known by man. All that can be said is that He knows Himself. It is to be hoped that Professor Siegel will expand his little essay and make clear the meaning of "God as such" and "nature *überhaupt.*" Dr. Klatzkin claims that the awkwardness in the use of Latin causes Spinoza to be misunderstood and that when translated into Hebrew many difficulties are resolved. True enough, the Hebrew equivalent of "*idea-ideatum*" is a more faithful reproduction of Spinoza's thought than the English version, "idea-object," but the full meaning of the "*idea-ideatum*" relation can only be recovered in the Greek *νοεῖν—νοητὸν.* The Greek term *ἀρετὴ* expresses Spinoza's notion of "*virtus*" whereas it is impossible to find a corresponding Hebrew equivalent. To translate Spinoza intelligently we must resort to the Greek of Plato and Aristotle. Professor Klausner infers the Jewish character of Spinoza's philosophy from the fact that both Judaism and Spinozism contain contradictions and inconclusive arguments. From external resemblances such as these, Mr. Klausner is hardly justified in making this inference, since the same line of reasoning could also serve to make the work of any mortal, Jewish in character. Again, in order to minimize Spinoza's antagonism against Judaism and to mitigate his contempt for the Cabbalists, Professor Klausner points out that Spinoza also spoke disparagingly of Plato and Aristotle. In a letter to Hugo Boxel, Spinoza does say that the authority of these Greek philosophers does not carry much

weight with him. From what follows it appears that Spinoza had in mind the Plato and Aristotle of "occult qualities, intentional species and substantial forms." The distinction between the Plato and Aristotle as they appear in their original works, and the Plato and Aristotle of the medieval theologians is one of great importance. Spinoza knew the latter and rediscovered the original. But Mr. Klausner's essay is a mine of information and well worth reading.

The volume edited by Professor Schaub consists of opening addresses by Professor Charles W. Morris and Dr. Harry W. Chase and papers by Mr. Schaub, Professor T. V. Smith, and Rabbi Solomon B. Freehof. Professor Schaub's essay combines admiration for Spinoza with dispassionate analysis. Though Spinoza tried to bring the findings of ethics, physics, psychology, and theology into one complete synthesis, the difficulties involved in his notion of substance, in the relation of the finite to the infinite, in determinism and in freedom, compel us to admit that he was not completely successful in his project. Professor Smith's paper is written in the Lockian spirit and may be regarded "as a protest against sitting still and perishing." It may abound to the credit of Spinoza that he learned to make the best of life at its worst and to live uncomplainingly with himself. Nevertheless, as an amateur in politics and as a formalist in ethics, he can not serve as a guide in our efforts to improve society. Thus, says Professor Smith, we celebrate Spinoza's birthday aright when, leaving the logicians in despair, we recommend him to the poets and to the theologians.

Professor Alexander suggests that while eighteenth-century rationalism and nineteenth-century science made it impossible to accept religion and God as part of one world, Spinoza, by "pursuing the method of neutrality, that is naturalism, establishes the ideals of good life, and maintains religion without excuses, and at the same time without affirming that either morals or religion, as so many suppose to-day, supplies us with directer knowledge of reality than physical science."

Mr. Sérouya's little book is an attempt at a popular exposition of Spinoza. It deals with the life and appeal of Spinoza more than with the systematic analysis of any one problem. The book is well written and the thirty-two illustrations in it are very beautiful.

One wishes that many of these essays were less enthusiastic and more profound, but perhaps one should not be too critical of papers written for the express purpose of celebrating a birthday and designed to improve persons rather than to clarify ideas.

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JOURNALS AND NEW BOOKS

THE PHILOSOPHICAL REVIEW. Vol. XLII, 6. Clauberg and the Development of Occasionalism: *A. G. A. Balz.* Locke's Theory of Ideas: *W. C. Swabey.* A Controversy in the Logic of Mathematics: *Alice Ambrose.* Discussion:—The Parmenides in the Light of the Propositional Function: *Eleanor Bisbee.* Morris's Six Theories of Mind: *A. O. Lovejoy.*

THE NEW HUMANIST. Vol. VI, No. 6. Civilization through the Contagion of Action: *A. E. Morgan.* In Defense of The Manifesto: *R. W. Sellars.* Paul Tillich and American Humanism: *Harold Buschman.* Why Insist on God?: *E. C. Vanderlaan.* A. N. Whitehead and the Rôle of Ideas: *E. A. Burtt.* Another View of Eddington: *V. C. Aldrich.*

Mace, C. A.: The Principles of Logic. An Introductory Survey. New York: Longmans, Green & Co. 1933. xiii + 388 pp. $4.50.

NOTES AND NEWS

The project of the American Philosophical Association, sponsored by the American Council of Learned Societies, for bringing up to date the bibliography of philosophy begun by Benjamin Rand in Baldwin's *Dictionary of Philosophy and Psychology* is under way. When completed the work will include a comprehensive list of books and articles on philosophy since 1902, classified both according to subject-matter and according to author. As an initial contribution to this undertaking we call attention to the publication by Longmans, Green & Company of William A. Hammond's *Bibliography of Aesthetics and of the Philosophy of the Fine Arts from 1900–1932.* This was published as a supplement to the May, 1933, issue of the *Philosophical Review,* but may be obtained as an independent book, price $3.00. It contains 2,191 titles, arranged according to subject-matter under seventeen heads, and will be found valuable not only for esthetics but for the general history and criticism of art.

We call attention also to *A Bibliography of Experimental Aesthetics 1865–1932* by Albert R. Chandler, which is "the result of an attempt to list the original reports of the psychological experiments in the field of aesthetics, together with the more important books and articles which give critical summaries or interpretations of such experiments." This is the first number of the Bureau of Educational Research Mimeographs of the Ohio State University Studies.

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Data, Datives, and Ablatives. F. C. S. SCHILLER.
Book Reviews. Journals and New Books. Notes and News.

Volume XXX. No. 19. September 14, 1933.

Recent Developments in Indian Thought. JAMES BISSETT PRATT.
Book Reviews. Journals and New Books. Notes and News.

Volume XXX. No. 20. September 28, 1933.

A Frequency Theory of Probability. ERNEST NAGEL.
Book Reviews. Journals and New Books. Notes and News.

Volume XXX. No. 21. October 12, 1933.

Naturalism and Agnosticism in Santayana.
STERLING P. LAMPRECHT.
Report of the Chicago Meeting of the American Philosophical Association. HAROLD A. LARRABEE.
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Volume XXX. No. 22. October 26, 1933.

Dualism and the Paradox of Reference. ARTHUR O. LOVEJOY.
Book Reviews. Journals and New Books. Notes and News.

Volume XXX. No. 23. November 9, 1933.

The Innocence of the Given. DONALD C. WILLIAMS.
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American Journal of Psychology.—Ithaca, N. Y.; Cornell University.
Subscription $6.50. 624 pages annually. Edited by M. F. Washburn, K. M. Dollenbach, Madison Bentley, and E. G. Boring.
Quarterly. General and experimental psychology. Founded 1887.

Pedagogical Seminary and Journal of Genetic Psychology.—Worcester, Mass.; Clark University Press.
Subscription $14.00 per yr.; $7.00 per vol. 1,000 pages ann. (2 vols.). Edited by Carl Murchison and an international coöperating board.
Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Genetic Psychology Monographs.—Worcester, Mass.; Clark University Press.
Subscription $7.00 per volume. Two volumes annually, 600 pages each. Edited by Carl Murchison and an international coöperating board.
Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Review.—Princeton, N. J.; Psychological Review Company.
Subscription $5.50. 540 pages annually.
Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin.—Princeton, N. J.; Psychological Review Company.
Subscription $6.00. 720 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs.—Princeton, N. J.; Psychological Review Company.
Subscription $6.00 per volume. 500 pages. Founded 1895. Edited by Raymond Dodge.
Published without fixed dates, each issue one or more researches.

Journal of Applied Psychology.—Baltimore; Williams & Wilkins Co.
Subscription $5.00. 400 pages. Founded 1917.
Quarterly. Edited by James P. Porter and William F. Book.

Psychological Index.—Princeton, N. J.; Psychological Review Company.
Subscription $4.00. 300–400 pages. Founded 1895. Edited by W. S. Hunter.
An annual bibliography of psychological literature.

Archives of Psychology.—Columbia University Post Office, New York.
Subscription $6.00. 500 pages per volume. Founded 1906. Edited by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology and Social Psychology.—Eno Hall, Princeton, N. J.
Subscription $5.00; foreign $5.25. Acting Editor, Henry T. Moore.
Quarterly. 448 pages annually. Founded 1906. Abnormal and social.

Psychological Clinic.—Philadelphia; Psychological Clinic Press.
Subscription $3.00. 288 pages. Edited by Lightner Witmer. Founded 1907.
Without fixed dates (9 numbers). Orthogenics, psychology, hygiene.

Journal of Educational Psychology.—Baltimore; Warwick & York.
Subscription $4.00. 540 pages. Founded 1910.
Monthly (9 numbers). Edited by Harold O. Rugg and coöperating board.

Comparative Psychology Monographs.—Baltimore; Williams & Wilkins Co.
Subscription $5.00. 500 pages per volume. Edited by W. S. Hunter.
Published without fixed dates, each number a single research. Founded 1922.

Psychoanalytic Review.—Washington, D. C.; 3617 Tenth Street, N. W.
Subscription $6.00. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Edited by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology.—Princeton, N. J.
Psychological Review Company. 900 pages annually. Experimental.
Subscription $7.00. Founded 1916. Bi-monthly. Edited by Samuel W. Fernberger.

Journal of Comparative Psychology.—Baltimore; Williams & Wilkins Co.
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Psychological Abstracts.—Princeton, N. J.
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Monthly. Abstracts of psychological literature. Founded 1927.

Journal of General Psychology.—Worcester, Mass.; Clark University Press.
Subscription $14.00 per yr.; $7.00 per vol. 1,000 pages ann. (2 vols.). Edited by Carl Murchison and an international coöperating board.
Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Journal of Social Psychology.—Worcester, Mass.; Clark University Press.
Subscription $7.00. 500–600 pages. Edited by John Dewey, Carl Murchison, and an international coöperating board.
Quarterly. Political, racial, and differential psychology. Founded 1929.

Character and Personality.—Durham, N. C.; Duke University Press.
Subscription $2.00. Edited by Robert Sandek and Ernest Seeman.
Quarterly. Psychodiagnostics and allied studies. Founded 1932.